THE UNIVERSITY OF ARIZONA
Cooperative Extension

az2038 February 2023

Enterprise Budgets

Spring Barley, Following Cotton, Flood Irrigated, Southern Arizona

Blase Evancho, Paco Ollerton Trent Teegerstrom and Clark Seavert

This enterprise budget estimates the typical economic costs and returns to grow spring barley after a cotton crop using flood irrigation in southern Arizona. It should be used as a guide to estimate actual costs and returns and is not representative of any farm. The assumptions used in constructing this budget are discussed below. Assistance provided by area producers and agribusinesses is much appreciated.

As of the date of this publication, the price for labor, fuel, fertilizer, and chemicals is increasing dramatically, which makes developing a long-term budget difficult. Therefore, a sensitivity analysis shows the net returns per acre as these inputs increase by 10 and 20 percent.

Cropping Pattern

This budget is based on a 1,500-tillable acre farm. As Arizona is experiencing irrigation water shortages, approximately 40 percent (597 acres) of the total farm tillable acres are fallowed. This fallowed land will allow adequate water to irrigate the following crops: 271 acres in cotton, 45 acres in silage corn, 90 acres in spring barley, 181 acres in durum wheat, and 316 acres of alfalfa hay. The costs to fallow land are allocated to each crop based on its water use. All crops are grown using flood irrigation.

Labor

Tractor driver labor cost is $17.89 per hour and general labor $14.55 per hour; both rates include social security, workers' compensation, unemployment insurance, and other labor overhead expenses. For this study, owner labor is valued at the same rate as tractor driver rates, and all labor is assumed to be a cash cost. Tractor labor hours are calculated based on machinery hours, plus ten percent.

Capital

Interest on operating capital for harvest and production inputs (six percent) is treated as a cash expense, borrowed for 6-months. An interest rate of six percent is charged as an opportunity to the owner for machinery ownership.

Machinery and Equipment

The machinery and equipment used in this budget are sufficient for a 1,500-acre farm with 1,000 acres in crops. The machinery and equipment hours reflect producing cotton, silage corn, spring barley, durum wheat, and alfalfa hay. A detailed breakdown of machinery values is shown in Table 2. Estimated labor, variable, and fixed costs for machinery are shown in Table 3, based on an hour and per acre basis. The machinery costs are calculated based on the total farm use of the machinery. Off-road diesel is $4.00 per gallon.

Operations

The cultural operations are listed approximately in the order in which they are performed. A 175-hp tractor is used to pull the v-ripper, heavy offset disk, moldboard plow, landplane, lister, and planter. A 125-hp tractor is used to pull the shredder/root puller, drill, cultivator, fertilizer spreader, and boom sprayer. A charge for miscellaneous and other expenses is five percent of production costs, including additional labor, machinery repairs and maintenance, supplies and materials, tax preparation, memberships in professional organizations, and educational workshops not included in field operations.

Results

In this budget the price of spring barley is $15 per cwt, with an average yield of 60 cwt, resulting in a gross

Funding provided by the USDA-NIFA, Grant # 2017-68005-26867. "Any opinions, findings, conclusions, or recommendations expressed in this publication/work are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture."

income of $900 per acre. Variable costs are $642 per acre and fixed cash costs of $252 per acre, giving a net return above variable cash costs of $5 per acre. Total fixed costs are $46 per acre and total costs of $941 per acre, when all variable and fixed costs are considered. The gross income minus total costs results in a -$41 per acre return. A breakeven price of $14.90 per cwt would be required to cover variable and fixed cash costs and $16.73 per cwt to cover total costs.

Tables 4 and 5 show the baseline net returns per acre for cash and total costs at various yields and prices as in this study. Tables 6, 7, 8, and 9 show a sensitivity analysis of returns per acre as the price for labor, fuel, fertilizer, and chemicals are increased an additional 10 and 20 percent.

NOTE: Not included in these budgets are family living withdrawals for unpaid labor, returns to management, depreciation and opportunity costs for vehicles, buildings and improvements, inflation, property and crop insurance, and local, state, and federal income and property taxes.

Table 1. Economic and Cash Costs and Returns of Producing Spring Barley Following Cotton, $/acre.

Returns			**Unit**	**$/Unit**		**Quantity**	**Value**
Spring Barley			ton	$0.08		22,000.00	$1,760.000
Total Returns							**$1,760.00**
Variable Cash Costs	**Price**	**Quantity**	**Unit**	**Labor**	**Machinery**	**Materials**	**Total**
Land Preparation and Maintenance							
V-Ripper		1.00	acre	$13.53	$34.60	$0.00	$48.13
Offset Disk		1.00	acre	9.43	23.76	0.00	33.19
Crop Prodcution							
Drill		1.00	acre	5.4`	10.13	58.50	74.04
- Seed	$0.39	150.00	pounds				
Ferlilizer Program		1.00	acre	1.88	3.73	182.91	188.52
- Nitrogen	$182.91	1.00	acre				
Boom Sprayer		1.00	acre	1.19	1.82	32.00	35.01
- Herbicides	$17.00	1.00	acre				
- Insecticides	$15.00	1.00	acre				
Irrigation				36.38	0.00	137.50	173.88
- Irrigation Water, Flood	$55.00	2.50	ac ft				
- Irrigation Labor, Flood	$14.55	2.50	hous				
Harvest							
Harvest custom[1]	$25.00	1.65	ton	0.00	0.00	41.25	41.25
Other Charges							
Other Expenses		5.0%		0.00	0.00	29.70	29.70
Interest on Operting Capital		6.0%		0.00	0.00	18.71	18.71
Total Variable Cash Costs				$126.11	$74.05	$500.578	$642.44
Fixed Cash Costs					**Unit**	**$/Unit**	**Value**
Fallow Costs					acre	$82.42	$82.42
Annual Cash Rent Payment					acre	170.00	170.00
Total Fixed Cash Costs							$252.42
Total minus Total Variable and Fixed Cash Costs							
Fixed Non-Cash Costs					**Unit**	**$/Unit**	**Value**
Power Units, Machinery & Equipment, depreciation & interst					acre	$45.88	$45.88
Total Fixed Non-Cash Costs							$45.88
Total Annual Costs							**$940.75**
Returns minus Total Annual Costs							**-$40.74**

[1] Cost includes cutting and hauling wheat from field to a market within a round trip of 20 miles..

Table 2. Whole Farm Machinery Cost Assumptions.

Machine	Width (feet)	Market Value	Annua Use	Hours of Expected Life (Years)
175 HP Tractor	N/A	$180,000	1,365	10
125 HP Tractor	N/A	80,000	495	15
V-Ripper	8.0	22,000	459	10
Offset Disk	18.0	30,000	517	15
Moldboard Plow	9.3	35,000	138	15
Landplane	16.0	18,000	78	15
Lister	10.0	6,500	99	15
Cotton Shredder/Root Puller	20.0	12,000	41	15
Row Planter	24.0	40,000	72	15
Row Cultivator	24.0	22,000	103	10
Drill	20.0	25,000	97	15
Fertilizer Spreader	40.0	18,000	109	20
Boom Sprayer	60.0	9,500	145	20

Table 3. Machinery Cost Calculations, on a per hour and per acre basis.

Machie	-Variable Costs- Fuel & Lube	Repairs & Maint.	Fixed Cost Deprec. & Interest	Total Cost
	---------- Costs Per Hour ----------			
175 HP Tractor	$36.80	$7.37	$17.20	$61.37
125 HP Tractor	23.00	1.78	18.31	43.09
V-Ripper	0.00	6.16	6.19	12.35
Offset Disk	0.00	5.40	6.48	11.88
Moldboard Plow	0.00	18.20	28.29	46.50
Landplane	0.00	3.24	25.80	29.04
Lister	0.00	1.78	7.32	9.10
Cotton Shredder/Root Puller	0.00	2.76	32.57	35.33
Row Planter	0.00	14.02	64.48	78.50
Row Cultivator	0.00	3.90	27.10	30.99
Drill	0.00	12.06	30.14	42.20
Fertilizer Spreader	0.00	14.31	19.02	33.34
Boom Sprayer	0.00	5.36	7.51	12.87

Field Operation	Acre/ Hour	Operator Labor	Variable Costs	Fixed Costs	Total Costs
		---------- Costs Per Acre ----------			
175 HP Tractor & V-Ripper	1.45	$13.53	$34.60	$16.08	$64.21
175 HP Tractor & Offset Disk	4.17	4.72	11.88	5.68	22.27
175 HP Tractor & Moldboard Plow	2.55	7.73	24.50	17.87	50.11
175 HP Tractor & Landplane	5.09	3.87	9.31	8.45	21.62
175 HP Tractor & Lister	3.18	6.18	14.44	7.71	28.33
175 HP Tractor & Shredder	6.64	2.97	4.15	7.67	14.78
175 HP Tractor & Planter	4.36	4.51	13.34	18.72	36.56
175 HP Tractor & Cultivator	6.55	3.01	4.38	6.94	14.32
175 HP Tractor & Drillr	3.64	5.41	10.13	13.32	28.87
175 HP Tractor & Fertilizer Spreader	10.47	1.88	3.73	3.56	9.18
175 HP Tractor & Boom Sprayer	16.55	1.19	1.82	1.56	4.57

Table 4. Estimated Per Acre Returns Over Cash Cost at Varying Yields and Prices.

	CWT per Acre						
Price/CWT	54.0	56.0	58	60.0	62.0	64.0	66.0
$13.50	($166)	($83)	($112)	($85)	($58)	($31)	($4)
$14.00	(139)	(111)	(83)	(55)	(27)	1	29
$14.50	(112)	(83)	(54)	(25)	4	33	62
$15.00	(85)	(55)	(25)	5	35	65	95
$15.50	(58)	(27)	4	35	66	97	128
$16.00	(31)	1	33	65	97	129	161
$16.50	(14)	29	62	95	128	161	194

Table 5. Estimated Per Acre Returns Over Total Cost at Varying Yields and Prices.

	CWT per Acre					
Price/CWT	54.0	56.0	58	62.0	64.0	66.0
$13.50	($212)	($185)	($158)	($104)	($77)	($50)
$14.00	(185)	(157)	(129)	(73)	(45)	(17)
$14.50	(158)	(129)	(100)	(42)	(13)	16
$15.50	(104)	(73)	(42)	20	51	82
$16.00	(77)	(45)	(13)	51	83	115
$16.50	(50)	(17)	16	82	115	148

Table 6. Estimated Per Acre Returns Over Cash Cost at Varying Yields and Prices with a 10 percent Increase in Fuel, Labor, Fertilizer and Chemical Costs.

	CWT per Acre					
Price/CWT	54.0	56.0	58	62.0	64.0	66.0
$13.50	($225)	($198)	($171)	($117)	($90)	($63)
$14.00	(198)	(170)	(142)	(86)	(58)	(30)
$14.50	(171)	(142)	(113)	(55)	(26)	3
$15.50	(117)	(86)	(55)	7	38	69
$16.00	(90)	(58)	(26)	38	70	102
$16.50	(63)	(30)	3	69	102	135

Table 7. Estimated Per Acre Returns Over Total Cost at Varying Yields and Prices with a 10 percent Increase in Fuel, Labor, Fertilizer and Chemical Costs.

	CWT per Acre						
Price/CWT	54.0	56.0	58	60.0	62.0	64.0	66.0
$13.50	($270)	($243)	($216)	($189)	($162)	($135)	($108)
$14.00	(243)	(215)	(187)	(159)	(131)	(103)	(75)
$14.50	(216)	(187)	(158)	(129)	(100)	(71)	(42)
$15.00	(189)	(159)	(129)	(99)	(69)	(39)	(9)
$15.50	(162)	(131)	(100)	(69)	(38)	(7)	24
$16.00	(135)	(103)	(71)	(39)	(7)	25	57
$16.50	(108)	(75)	(42)	(9)	24	57	90

Table 8. Estimated Per Acre Returns Over Cash Cost at Varying Yields and Prices with a 20 percent Increase in Fuel, Labor, Fertilizer and Chemical Costs.

	CWT per Acre					
Price/CWT	54.0	56.0	58	62.0	64.0	66.0
$13.50	($287)	($260)	($233)	($179)	($152)	($125)
$14.00	(260)	(232)	(204)	(148)	(120)	(92)
$14.50	(233)	(204)	(175)	(117)	(88)	(59)
$15.50	(179)	(148)	(117)	(55)	(24)	7
$16.00	(152)	(120)	(88)	(24)	8	40
$16.50	(125)	(92)	(59)	7	40	73

Table 9. Estimated Per Acre Returns Over Total Cost at Varying Yields and Prices with a 20 percent Increase in Fuel, Labor, Fertilizer and Chemical Costs.

	CWT per Acre					
Price/CWT	54.0	56.0	58	62.0	64.0	66.0
$13.50	($333)	($306)	($279)	($225)	($198)	($171)
$14.00	(306)	(278)	(250)	(194)	(166)	(138)
$14.50	(279)	(250)	(221)	(163)	(134)	(105)
$15.50	(225)	(194)	(163)	(101)	(70)	(39)
$16.00	(198)	(1166)	(134)	(70)	(38)	(6)
$16.50	(171)	(138)	(105)	(39)	(6)	27

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AUTHORS

Blase Evancho
Area Agent, Arizona Cooperative Extension, University of Arizona

Paco Ollerton
Producer in Pinal County

Trent Teegerstrom
Ag Econ Extension Specialist, Department of Agriculture and Resource Economics, University of Arizona

Clark Seavert
Agricultural Economist, Department of Applied Economics, Oregon State University

CONTACT

Trent Teegerstrom
tteegers@cals.arizona.edu

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